REMARKS

The Examiner's rejection of Claims 1-5 under 35 USC 103(a) as unpatentable over Hann et al U.S. Patent Number 6,479,433 (hereinafter Hann '433) in view of Garrett U.S. Patent Number 5,617,672 (hereinafter Garrett '672) and further in view of the University of Florida reference is traversed.

Claims 6 and 7 have also been rejected under 35 USC 103(a) as unpatentable over Hann '433 in view of Garrett '672 and further in view of the University of Florida reference and further in view of the reference to Buckman and Brady and this rejection is traversed.

Claims 8-1 1 and 13 have been rejected under 35 USC 103(a) as unpatentable over Hann '433 in view of Garrett '672 and further in view of the University of Florida reference and further in view of Cook and this rejection is traversed.

Claim 12 is rejected under 35 USC 103(a) as unpatentable over Hann '433 in view of Garrett '672 and further in view of the University of Florida reference and further in view of Decker U.S. Patent Number 5,899,020 (hereinafter Decker '020) and this rejection is traversed.

Claims 14 and 15 have been rejected under 35 USC 103(a) as unpatentable over Hann '433 in view of Garrett '672 and further in view of the University of Florida reference and further in view of Caron et al. U.S. Patent Number 6,178,691 (hereinafter Caron '691) and this rejection is traversed.

Claims 16 -19 have been rejected under 35 USC 103(a) as unpatentable over Hann '433. in view of Garrett '672 and further in view of the University of Florida reference and further in view of the Cook reference and Caron '691 and this rejection is traversed.

Claims 20-23, 25 and 26 are have been rejected under 35 USC 103(a) as unpatentable over

Hann '433 in view of Garrett '672 and further in view of the University of Florida reference and the Cook reference and Caron '691 and this rejection is traversed.

The claims of the present invention are directed toward a horticultural growing medium capable of supporting plant growth in the form of a diphenylmethane diisocyanate **unfilled foam material** having a cation exchange capacity (C.E.C.) ranging from 1.0 to about 1.5 milliequivalents (meq)/100 g. The material has pore sizes of various ranges in various percentages and a total porosity ranging from 85% to 95% and a neutral pH ranging from 6.8 to 7.8.

The Hann et al '433 patent teaches the making of a **horticultural growing medium with at least one filler material**. The method of making the foam is with a quasi-prepolymer/filler mixture. A person having ordinary skill in the art to which the subject matter pertains would not confuse quasi prepolymer chemistry with non-quasi-prepolymer chemistry. There is also no teaching of pH or of C.E.C. or of porosity or of pore size or of sterility.

The Examiner's assertion that the Garrett '672 reference teaches hydroponic (Col 7, ln 58-65, "no soil") use is unsupported by the data presented in the reference itself. Language within the specification indicates that filler material is necessary in order to practice this technology, and in fact, **increased concentrations of ureaformaldehyde foam will retard growth** (Col 3, lns 48-54, "foam can be present from about 5% to about 60% ... to increase the growth rate [and] to decrease the growth rate ... foam can be present in an amount from about 50% to about 90%"). This statement is further supported by the data presented. Figures 4, and 5, and Tables 2 – 4 plainly indicate that in all cases, "shoot weight" (i.e., the best indicia of vigor in the non-tuberous vegetables subject to testing) was inversely related to increasing concentrations of ureaformaldehyde foam, and was correspondingly lowest at the highest concentration of

ureaformaldehyde foam (75% PLASTSOIL / 25% Peatlite). No data is presented regarding testing of 100% ureaformaldehyde foam. However, contrary to the aforereferenced statement regarding hydroponic use, extrapolation of the data indicates that plants grown using an exclusively ureaformaldehyde formulation will fail to thrive.

Additionally, the Garrett '672 reference is directed toward a soil additive using a foam having a bulk density of approximately 1 pound per cubic foot. This reference can be dismissed in its entirety as it is directed to ureaformaldehyde foam. As noted on Col 4 lns 59-63: "Generally, the present invention is directed to a plant growth media comprising a ureaformaldehyde foam that can be used to control the growth rate of the plants or to decrease the growth rate of the plants" The foam in powdered form is added to a soil formulation such as natural soils, potting soil, peatlite, vermiculite, peat moss and mixtures thereof. There is filler material in the foam (carbohydrates additives) under any interpretation of the specification., either in powder form mixed with soil or as a hydroponics block. It is readily understood by one of ordinary skill in the art that **ureaformaldehyde foam is made from reacting formaldehyde and urea and is totally different in composition and structure in relation to the unique foam of the present invention.**

Furthermore as noted in Col. 5 lns.19-26 "In a preferred embodiment of the present invention, the ureaformaldehyde foam used is a foam marketed under the trade name PLASTSOIL, which can be obtained Coverfoam Services, Inc. Located in Florance, S.C. PLASTSOIL, which is a predominantly open celled hydrophilic foam, has **an appearance similar to that of "cotton candy" and has a bulk density of approximately 1 pound per cubic foot."** The present inventive foam is totally different in structure.

Garrett '672 also does not show any cation exchange capacity (hereinafter C.E.C.) for the material, relying upon the organic composition (filler) of the mixture and the carbohydrate additives to provide same. PLASTSOIL is a cellular plastic composition made from reacting formaldehyde and urea in particular concentration unique to PLASTSOIL, carbohydrate such as glucose, fructose, and sucrose can be incorporated into the foam (col. 5, lns. 34-49) *** **Although unknown, it is possible that the unexpected results achieved by the process of the of the invention (Garrett '672) are attributable to the carbohydrate additives.** (Col. 5, lns. 46-49).

Where used in the process of the present invention, PLASTSOIL is broken down and used in powdered form. (Col. 5, 55-57).

When using the ureaformaldehyde foam in accordance with the Garrett '672 invention, the foam in powdered form is preferably mixed with a conventional soil formulation and used as a plant growth medium. The foam can be added to a soil formulation in amounts from about 5% to 90% by volume depending upon the circumstances and results desired (col. 5, lns. 58-66). It should be noted that Ureaformaldehyde foam has a residue (ppm) of formaldehyde remaining in the foam material. Garrett '672 does not teach pore size or porosity, C.E.C.the use of foam without a filler or a sterile foam.

In the present invention it was unexpected that the invented foam formulation would produce a hydrophilic foam with a C.E.C. of from 1.0 to 1.5. As previously noted, **Hann '433 is also directed toward filled foams.**

The University of Florida reference is directed toward growth media such as peat, pine bark, Sphagnum moss, hardwood bark, Melaleuca bark, animal manure, sawdust, wood shavings, wood residue, bagasse, polyphenolic foam, hydrophilic gels, Perlite, Vermiculite, polystruene

foam, rock wool and calcined clays. This reference does not teach or suggest the use of polyurethane foam as a growing media. Furthermore this reference teaches that an optimum pH of a container medium falls between 5.0 and 6.5 (Page 6) away from the neutral pH of 6.8 -7.8 claimed by applicant.. The reference also notes that a pH above 7.5 usually results usually results in chemical binding of micronutrients. Thus the pH of the present invention is specifically taught away from.

The C.E.C. is generally discussed in the reference and there is no discussion of a foam having a C.E.C. from 1 to 1.5. The reference simply notes that sands and other low surface area materials have low cation exchange capacities while organic components have a greater ability to retain cations. As noted on page 7 in the University of Florida reference "Pine bark has a cation exchange capacity in the range of 10 to 13 milliequivalents per 100 cubic centimeters while a CEC of approximately 1 is common for builders' sand." Contrary to the allegations of the Examiner, this is not a teaching of a C.E.C. for the foam of the present invention. The University of Florida reference cannot be combined with the cited art.

In the same manner the Buckman & Brady reference does not make any reference to polyurethane foam. Furthermore contrary to the argument of the Examiner, the reference does not disclose the foam pH range as argued by the Examiner and the which pH is discussed is related to soil. In this regard the availability of several of the essential nutrients are noted which are drastically affected by soil pH as is the solubility of certain elements that are toxic to plant growth. As noted several elements tend to become less available to plants as the pH of soil is raised from 5.0 to 7.5 or 8.0 such as iron, manganese and zinc. This reference supplies to teaching to the present invention

The Cook reference also does not make any reference to polyurethane foam and only references soil particles. The article is simply with regard to determining the size of the pores of different types of soil and the estimation of sandy loam is an average pore size of 0.09mm. More importantly, **the ranges cited by the Examiner are with regard to particulate size, not porosity**. The reference merely provides directions for determining currently extant pore size in soil depending on the particulate composition and compaction of said material. In contrast, pore size in the instant invention has been determined in order to yield an optimum "porosity ranging from 85% to 95%, prefereably from 90% to 92%."

In the same manner the Decker '020 reference is rejected with regard to the present invention as it does not make any reference to polyurethane foam as a growing media. It only references growing warm season grasses in selected sterile media over plastic sheeting with a sterile medium such as composted yard waste, composted sewage sludge, sand or conifer bark or combination of these materials.

Likewise the Caron '691 reference teaches a carpet irrigation system with no references to polyurethane foam.

Since the present invention does not introduce any fillers to the matrix, there is less possibility to contaminate the matrix and render it un-sterile. Sterile materials conform to agricultural requirements currently in place thus making it easier to ship plants and the media materials across national borders. None of the references teaches the use of an unfilled foam material with a C.E.C. ranging from 1.0 to 1.5, with sterility which has been previously noted as a necessary requirement when shipping plants internationally or has optimum pore sizes and porosity for fluid transfer to the plant. It may be obvious to one of ordinary skill in the art that air

water ratios can be altered with the addition of fillers, but it is not obvious how to obtain air water ratios without the use of fillers. When one puts additives in foam, pore size is exceptionally difficult to control. Those skilled in the art would know that fact. Thus pore size is not inherent. Furthermore chemical reactions that take place in filled foam are such that sterility is not inherent in filled foams.

As previously noted the claim of pore size and porosity is a further description of the unique unfilled foam with unexpected properties.

One of ordinary skill in the art would realize that polyurethane foam cannot be made without an isocyanate being one of the ingredients. The present invention uses a unique **unfilled** foam with unexpected properties that support plant growth.

Hann et al '433 and Garrett '672, disclose in the prior art various growth media of foams, which **use filler in the growth media because un-filled polyurethane foam was not believed to be a suitable growth media. It was unexpected to discover that the un-filled polyurethane foam of the present invention has the required properties of a suitable growth media, pH, porosity, pore size, C.E.C. ranges and foam material**. C.E.C. is not predictable as it depends upon the structure of molecules that make the foam. Different ingredients in making foam will give different C.E.C. Density also changes the C.E.C. as do the foaming ingredients and the thousands of variables of additives, each with a different C.E.C.

In cases which are similar to the present circumstances, the courts have ruled that beyond looking at the prior art to determine if it suggests doing what the inventor has done, one must consider if the prior art provides an expectation of succeeding in the endeavor. *In re Dow Chem.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988), "Both the suggestion and the

expectation of success must be founded in the prior art, not in the applicant's disclosure." Id. As noted by the court in the case of *In re Clinton*, "Obviousness does not require absolute predictability, but a reasonable expectation of success is necessary." *In re Clinton*, 527 F.2d 1226, 1228, 188 U.S.P.Q. 365, 367 (C.C.P.A.1976).

As noted by the Court in the case of *In re Gordon*, the mere fact that a prior art reference could be modified to achieve the claimed invention does not make the modification obvious unless the prior art suggested the desirability of the modification. *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir.1984); see also *In re Laskowski*, 871 F.2d 115, 117, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989), and *Ex parte Levengood*, 28 U.S.P.Q.2d 1300, 1302 (Bd. Pat. App. & Int. 1993). Applicants respectfully submit that nowhere in the art of record is there any suggestion to arrive at the claimed novel composition of the present invention.

The court in *In re Baird*, 29 USPQ2d 1550 (Fed. Cir. 1994), held that "The fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious." The *Baird* court further held that a disclosure to numerous compounds does not render obvious a claim to three compounds, particularly when that disclosure indicates a preference leading away from the claimed compounds.

As previously argued, none of the cited references singularly or in combination suggest teach or obviate the present invention and indeed cannot be combined. The examiner has engaged in hindsight application, a prohibited refection since *John Deere* to combine the cited prior art references against the present invention.

The present invention uses a unique **unfilled** foam with unexpected properties that support plant growth.

Applicants respectfully submit that nowhere in the art of record is there any suggestion or combination to arrive at the claimed novel composition of the present invention.

Garrett (US 5,617,672) and Hann et al. (6,479,433) disclose various growth media of foams, which use filler in the growth media because un-filled polyurethane foam was not believed to be a suitable growth media. It was unexpected to discover that the un-filled polyurethane foam of the present invention has the required properties of a suitable growth media.

SUMMARY OF APPLICANTS RESPONSE

1. Hann '433 teaches the making of a horticultural growing medium with at least one filler material

2. Garrett '672 is not useful when practiced with "no soil" and increasing concentrations of ureaformaldehyde retards, and likely eliminates, growth.

3. Buckman & Brady do not disclose a pH range for a novel, exclusively foam material horticultural growing mediam. Similarly, the University of Florida reference indicates an optimum pH of 5.0 to 6.5 and teaches away from the neutral pH of 6.8 – 7.8 claimed by applicant.

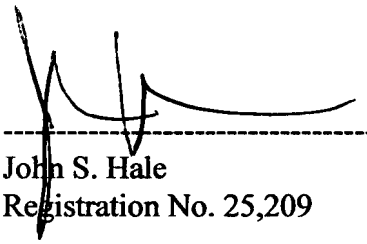
4. The Cook and University of Florida references merely recite CEC, porosity, and pore size in existing soils. No recommendations are presented with regard to ideal values.

A Check for the three month extension of time is attached with this amendment along with a Notice of Appeal and official fee. If any additional costs arise, charge deposit account 07-1340

It is respectfully requested that the arguments and amendments present in the present application in condition for favorable reexamination and that the application be passed to issue.

Respectfully submitted,

GIPPLE & HALE



John S. Hale
Registration No. 25,209

6665-A Old Dominion Drive
McLean, Virginia 22101
(703) 448-1770 ext. 304
Attorney Reference: X-9425